



The Newsletter of the Department of Nuclear Engineering

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## NANT Scholarships

The National Academy for Nuclear Training (NANT) Scholarship Program awards scholarships to college students who have demonstrated outstanding academic achievement and who are interested in pursuing careers in the nuclear power industry. The scholarships are funded by all U.S. utilities that operate nuclear power plants and by companies that offer services to the nuclear industry.

For the 2001-2002 academic year, 36 new NANT undergraduate scholarships of \$2,500 have been awarded nationwide to nuclear engineering students. Two undergraduate students (6% of the total awards) in the Nuclear Engineering department at UMR are recipients of new NANT scholarships. These students are sophomore Patrick Wallain and senior Jamie Ferrero. Congratulations to Patrick and Jamie!

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## Students Participate in Summer Research

Our students found the summer of 2001 to be a great one for research opportunities. Eleven undergraduate students investigated research projects that interested them and gained valuable experience through their collaboration with national laboratories, utilities and corporations.

Seniors Virginia Cleary, Jamie Ferrero, Micah Hackett, and Heather Nydegger participated in the student research program at Lockheed Martin's Knolls Atomic Power Laboratory in Schenectady, New York. Virginia ran an in-house code and developed a computerized method for neutronic parameters for a nuclear submarine core. Jamie worked on a new core design for the CVNX carrier and NR2 submarine. Micah performed shielding optimization studies for the Virginia-class nuclear submarines and created a preliminary shield design model for a future class of attack submarines. Heather worked on a study of a gamma energy group structure for discrete ordinates methods.

John Howell (Senior) was with Entergy Nuclear South, River Bend Nuclear Station in St. Francisville, Louisiana. He did reactor engineering work to support the upcoming refueling outage, designed the initial plan for the core shuffle, and upgraded a Jet Pump program in FORTRAN to automate surveillance test procedures. Joe McGuinness (Senior) was at Nuclear Management Company, Inc., Duane Arnold Energy Center, in Palo, Iowa. Joe helped to analyze and update the current PRA revision and worked with emergency core cooling system flow calculations.

Tracia West (Senior) worked at Black & Veatch Engineering on the design of an ABWR. Gioresca Willis (Senior) worked at the Idaho National Engineering and Environmental Laboratory on the Desalination Economic Evaluation Program that is researching the coupling of nuclear power plants with desalination plants.

Benjamin Amiri (Junior) was at the Los Alamos National Laboratory and worked on burnup calculations and material properties for two fission systems designed for space exploration. Jane Diecker (Junior) did irradiated materials research at Electricite de France in Les Renardies, France. Julie Tucker (Junior) worked at Kaw Valley Engineering in Lenexa, Kansas and ran tests on soil and asphalt and did some field testing with concrete and drilling.

MORE TO COME 

## Message from the Chairman

Greetings! I am writing to share with you some of the successes we had during the past year and our challenges during the coming years. We had a very successful camp for high school students last summer, and we upgraded our computing and laboratory facilities significantly. Also, our students did very well in receiving NANT and ANS scholarships.

At the Nuclear Engineering Summer Camp 2001, there were 64 attendees from high schools nationwide, in comparison to only 7 in Summer Camp 2000. The expenses for this year's camp were primarily derived from USDOE/Ameren UE matching funds. Mr. Tod Moser and Mr. Mike Taylor of Ameren UE contributed a lot of their valuable time, and gave personalized tours of the Callaway plant to the attendees. Dr. Eric Loewen of INEEL and Dr. Gerald Schlapper of LANL both spent about a week each at UMR, made numerous presentations, and escorted them to the Callaway Plant and Ft. Leonard Wood Radiation Sciences Center. In addition, ten UMR Nuclear Engineering students, three Nuclear Engineering professors, and Dr. Susan Langhorst of Washington University made presentations, escorted attendees or assisted them in numerous ways. I express my sincere gratitude to all those who helped. Had it not been for your donations and matching funds from your employers, we would have been severely limited in making the Summer Camp free to the attendees. We have decided that we would like to keep next year's Summer Camp free as well. Hopefully, we will have at least as many attendees next year as we had this year. Thirty of this year's attendees expressed their interest in applying for admission to the UMR Nuclear Engineering program for Fall 2002. This extensive effort will undoubtedly increase our enrollment substantially.

Our radiation measurement laboratory and the instructional computing equipment were significantly upgraded last year. To upgrade the radiation measurement laboratory, we purchased a TLD reader and four NaI detector systems for approximately \$50,000. The computing equipment upgrades for instruction included nine computers, and a color laser printer at a total cost of approximately \$17,000. Funding for the equipment was derived from USDOE grants, campus funds, and contributions from alumni.

It is obvious that financial support from our alumni is an important part of the expenditures toward our recruitment efforts and toward the upgrade of instructional laboratories and computing equipment. Your support is gratefully appreciated.

Our students have been very successful in obtaining ANS and NANT scholarships. Jane Diecker and Tracia West received substantial scholarships from ANS. Micah Hackett, Heather Nydegger, Jane Diecker, Julie Tucker, Bill Danchus, and Tracia West received renewed NANT scholarships. Congratulations!

Let me tell you about some of our challenges we face in the next few years. Low enrollment in Nuclear Engineering is definitely one of them. Although we have taken significant steps, particularly with hosting the Nuclear Engineering Summer Camps, to address the enrollment issue, we must continue to work hard toward increasing the B.S. graduation rate.

The other challenge is a continuous decline in the annual operating budget of the department and a reduction in the campus support for Graduate Teaching Assistants, due to a very low campus enrollment of about 4,500 students. Low enrollment has resulted in a reduction in the amount of fees the campus collects to support the general operating budget. Therefore, we must rely on externally generated funds to support our increasing recruitment efforts, and the continued upgrade of our instructional laboratories and computing facilities.

We would like to keep in touch with you. Please take a moment to fill out the questionnaire, "What's New With You?" With your permission, we would like to share the news with all alumni and friends of the department. I would like to alert you to the next six-year evaluation of the department which will take place in Fall 2002 by the Accreditation Board on Engineering and Technology (ABET). ABET requires that we regularly upgrade our curriculum in response to the needs of employers of our graduates. Based in part on your input, we have made significant changes to our curriculum. We now require a new freshman course, Nuclear Technology Applications (NE 25), and a senior level course, Nuclear Fuel Cycle (NE 307), as required courses. To assist you in filling out the enclosed "2001 UMR Nuclear Engineering Alumni Questionnaire," you can visit our website [www.nuc.umn.edu](http://www.nuc.umn.edu) to examine the undergraduate catalog. Please take time to fill out this questionnaire and send it to us as soon as possible. We will use a summary of all of the suggestions, and the department's actions and responses to your suggestions, to support our request for obtaining the next six-year accreditation of the Nuclear Engineering program. We are proud that the UMR undergraduate program has been continuously accredited since 1960.

With Best Wishes from the Department,

Arvind S. Kumar

THERE'S MORE



## **Nuclear Engineering Summer Camp 2001**

UMR Nuclear Engineering Camp 2001 was a great success this summer. We expanded to two sessions, July 22-27 and July 29-August 3. We sent camp flyers all over the country and posted an internet banner on the Hotmail website. We received 66 applications from high school juniors, seniors, and graduates plus a former Marine Corps sergeant! All but two applicants attended. The nationwide recruiting efforts of the members of the Nuclear Engineering Development Board were greatly appreciated.

Nuclear Engineering students Eric Rosener and Tyson Bourbina created and arranged activities for the "campers" such as morning warm-up games using references to nuclear engineering terms that the students were learning during the week and a Computer Learning Center "scavenger hunt" on nuclear industry sites on the internet. The students performed a nuclide identification experiment in the Radiation Measurements Lab and discovered natural radioactivity across the UMR campus.

Our nuclear engineering "campers" were treated to an introductory pizza party the first night and free room and board at Thomas Jefferson dormitory for the week. They also were given specially designed and personalized information and work notebooks, T-shirts, pens, Frisbees, and enjoyed movie night, bowling night, a pool party, and a Bar-B-Q with the Jackling II students, faculty and UMR students at Schumann Park.

Thirty (30) of the 64 campers indicated that they applied or would apply for admission to UMR's Nuclear Engineering Department in Fall 2001 or Fall 2002. The evaluation sheets filled out by the "campers" on the last day indicated that they had a great time! Darrell Stevenson, a Rolla high school student interning in the Nuclear Engineering Department for the summer, created an action packed video CD as a souvenir for each of the campers. Our summer camp was a genuine success! We are looking forward to Nuclear Engineering Camp 2002!

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## **Dr. Tokuhiro's First Year Report**

Hi! Last year I introduced myself as the newest faculty member to join the Department of Nuclear Engineering as an Assistant Professor. I also assumed the Directorship of the UMR Reactor facility. My first year at UMR was...in one word, exciting. In January 2001, I passed my Senior Reactor Operator's license exam and taught the following: an introductory nuclear technology course to freshmen, reactor operations and a second course in reactor-based experiments. This FS2001, I am teaching nuclear reactor engineering, a first course in reactor experiments and again, reactor operations. Since my arrival, I have initiated new research and training activities at the reactor facility. We are currently hosting 5 high school projects, preparing 10 student operator trainees (freshmen and sophomores) for the Reactor Operator exam, investigating "fingerprinting" of local wines via NAA, and testing the radiation resistance of electronic components (chips) and devices. We are hosting a teachers' workshop, actively seeking research projects and investigating potential projects in robotics/remote sensing technology for reactor environments.

As for research topics in my Thermal Fluid Sciences Laboratory (TFSL, "tough sell") in Fulton Hall, my research team consisting of a great bunch of undergraduates (6 OURE students) and graduates (3 Master's) are working on the following: 1) air bubble dynamics in vertical (water) channel flow using Particle Image Velocimetry (a laser technique) with Laser Induced Fluorescence (PIV-LIF), assessment methodology of prototype artificial heart valve designs using Ultrasound Doppler Velocimetry and natural convective flows in liquids with hydrophilic particles.

Finally, I would like to thank the department and the School of Mines & Metallurgy for their support in my first year. These are exciting times for UMR-NE. Our enrollment in the coming year or two is expected to skyrocket; our NE Camp, held in two one-week sessions, hosted 65 students! No doubt, we will keep you informed.

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## **Dr. Tsoulfanidis Awarded DOE/NEER Grant**

A 3-year DOE/NEER grant was awarded to Dr. N. Tsoulfanidis to develop neutron transport computational algorithms for an Accelerator Driven System (ADS). In an ADS, a beam of high-energy protons from a charged particle accelerator impinges upon a target and produces a source of high-energy spallation neutrons. The target is surrounded by a fissionable material, thus more neutrons are produced through fission; the whole system will always be in a subcritical state. The neutrons produced will be used to transmute radioactive wastes and produce power in this subcritical reactor. The high-energy spallation neutron source, the beam tube streaming path and the loosely coupled subcritical configuration in an ADS present neutronic computational challenges not present in conventional reactor physics calculations. A co-investigator for the project is Dr. Elmer Lewis of Northwestern University.

## Alumni Set A New Record for Contributions

Nuclear Engineering alumni set a new record with \$8,845 in gifts to the department during the 2000-01 phonathon. The new record surpasses the previous record of \$8,110 set in 1995-96 by 9%. Of the 324 Nuclear Engineering alumni, 26 percent participated in the 2000-01 phonathon. The average gift of \$104 also established a new record, beating out last year's record average of \$95. Most impressive is that gifts exceeded pledges of \$7,265 by 122 percent or \$1,580!

"Thank you for your generous support of the nuclear engineering program," says Dr. Arvind Kumar, chair of Nuclear Engineering. "As you know, there is a severe shortage of nuclear engineers in our nation. Every gift that you give to UMR's Nuclear Engineering Department helps us attract more students and helps to close in the gap in our nation's needs for nuclear engineers. Your gifts also help us remain a leader in nuclear engineering education." This year's gifts will increase the number of undergraduate scholarships, help attract more students to nuclear engineering plus improve and upgrade our laboratory facilities.

Along with making a pledge, please take time to talk with our UMR students. They appreciate the encouragement and guidance you offer them. A few days after our call, you will receive a pledge letter by mail. Please include your company's matching gift form, if your company is a matching gift contributor. Any amount you give will be appreciated, and most importantly, you will make a positive difference in the lives of our students.



### Phonathon October 14 - 17, 2001.

This year's Phonathon is scheduled for October 14-17, 2001. Nuclear Engineering students will be contacting you during this time period. Your generous contributions allow us to help our students with the costs of attending UMR and greatly aid our recruitment efforts. In addition, we can upgrade our labs by providing matching funds for equipment purchases. We look forward to talking to you again!

*The Nuclear Engineering department would like to thank and acknowledge the following alumni, friends and companies for their generous contributions between July 1, 2000 and June 30, 2001.*

#### GIFTS LESS THAN \$100

Alley, Michael E '96  
Ballinger, Clinton T '87  
Blase, John J '74  
Blondin, Dennis G '74  
Covey, Mark K '82  
Endsley, Charles M '75  
Flynn, Darrell C '79  
Gharakhani, Maria G '77  
Hadley, Stanton W '79  
Hart, Charles M '86  
Hinton, William K '76  
Holtzscher, Dale L '72  
Hovland, Rebecca M '98  
Huecker, Jonathan D '93  
Kalter, Charles J '72  
Kuspa, John P '72  
Lansberry, Mark R '95  
Lawson, James A '89  
Lee, Darrell R '76  
Lemaster, Roger D '78  
Lewis, Jeffery L '76  
Liles, Darrell R '96  
Lojek, Jan R '69  
McLaughlin, Matthew K '92  
Norris, Christopher W '80  
Pendergrass, Gary J '84  
Rackley, Kevin D '80  
Ragland, Rachel L '99  
Richardson, Brian D '96

Sautman, Mark T '91  
Schottel, Jimmy D '70  
Shelton, Dale A '85  
Shrestha, Bijaya '95  
Singer, Richard J '75  
Smith, Lenard A '92  
Starke, Richard M '71  
Szatkowski, Daniel J '89  
Taber, Brian K '91  
Thompson, Russell R '84  
Thro, John R '78  
Van Asdale, Shawn M '94  
Wahler, Vincent C '65  
Walz, Mark D '80  
Wells, David W '97  
White, Travis L '96

#### GIFTS \$100 OR MORE

Aguilar, Omar Ivan '85  
Barkalow, Thomas W '74  
Bartlett, Bruce L '80  
Brian, William R '78  
Burchill, William E '64  
Buth, Donald J '85  
Covington, Lorne J '86  
Cragg, Christopher D '85  
Daiber, Bryan J '87  
Daily, Charles R '83

Easson, Sheldon A '75  
Eastburn, Michael R '67  
Eshelman, Curtis D '86  
Ford, Michael J '88  
Garner, Harold R '76  
Graham, Jacqueline S '80  
Hayward, Robert L '75  
Kinn, Gregory S '87  
Mertz, Steven M '89  
Minarich, Craig M '98  
Moffett, Donald L '74  
Mueller, Gary E '76  
Palmtag, Scott P '93  
Reid, Billy W '77  
Pearman, John O '84  
Rempe, Joy L '81  
Ross, James D '94  
Sakowicz, Paul M '93  
Schnell, Donald F '86  
Shelton, Jeffrey D '98  
Smith, Jeffery Joel '87  
Steinmetz, Keith A '94  
Struve, James E '73  
Tsoulfanidis, Nicholas  
Wolkenhauer, William C '62

*The gifts received by the department from individuals total \$8,845.*

*The following corporations made gifts to the Nuclear Engineering Department during the same time period.*

Accenture  
AmerenUE  
Bechtel Foundation  
Commonwealth Edison Company  
Energy Operations, Inc.  
Energy Services Incorporated  
IES Industries Inc.  
Pennsylvania Power & Light Company  
Pricewaterhousecoopers Foundation  
Southern Nuclear Operating Company  
Studsvik of American, Inc.

*The matching gifts received by the department from corporations total \$1,025.*